

# **Sitewide Groundwater and Vadose Zone Project**

**Implementation Plan for  
July 1, 2011 through June 30, 2013**

***TOWARDS EXPEDITED CLEANUP OF SOIL AND GROUNDWATER AT THE  
HANFORD SITE***



**WASHINGTON STATE  
DEPARTMENT OF ECOLOGY  
NUCLEAR WASTE PROGRAM**

**Project Manager: Dib Goswami, Ph.D.**

## ***TABLE OF CONTENTS***

<b>CONTENTS</b>	<b>PAGE NUMBER</b>
• ECOLOGY: MISSION, VISION & OBJECTIVES	3
• NUCLEAR WASRE PROGRAM: MISSION & OBJECTIVES	4
• PROJECT MISSION & OBJECTIVES	5
• PROJECT PRINCIPLES	5
• PROJECT SCOPE	5
• PROJECT STRUCTURE	6
• JOB DESCRIPTION	8
• DATA DIRECTORY	15
• PROJECT ASSUMPTIONS	15
• PROJECT PRIORITIZATION BINS	17
• PROJECTIONS INTERFACES	18
• CONTRACTED NEEDS AND/OR SUPPORT	19

# WASHINGTON STATE DEPARTMENT OF ECOLOGY

## **Mission**

The mission of the Department of Ecology is to protect, preserve and enhance Washington's environment, and promote the wise management of our air, land and water for the benefit of current and future generations.

## **Vision**

Washington is a beautiful state in which to live and work. Our vision is to preserve our quality of life through environmental stewardship. Environmental stewardship means citizens; business, tribes and local, state and federal governments each take responsibility to protect our environment.

## **Objectives**

- Ecology will reduce risks to human health and protect Washington's land, air and water.
- Ecology will work for environmental solutions which respect local values and contribute to economic vitality.
- Ecology will strengthen our organization to meet new challenges and provide high-quality services.
- Ecology will continue to build a supportive work environment.



## NUCLEAR WASTE PROGRAM

### *MISSION/OBJECTIVES*

THE MISSION OF THE NUCLEAR WASTE PROGRAM (NWP) IS TO ENSURE SOUND MANAGEMENT OF NUCLEAR WASTE STATEWIDE AND TO PROMOTE THE SOUND MANAGEMENT AND PROTECTION OF THE ENVIRONMENT AT, AND ADJACENT TO, THE U.S. DEPARTMENT OF ENERGY'S HANFORD SITE.

THE OBJECTIVES OF THE NUCLEAR WASTE PROGRAM ARE:

- ◆ *ENFORCE* REGULATORY COMPLIANCE AND CLEANUP AT THE HANFORD SITE AND AT OTHER FACILITIES MANAGING NUCLEAR WASTE STATEWIDE.
- ◆ *PROMOTE* PUBLIC INVOLVEMENT, CONGRESSIONAL AND FEDERAL CONTACT, AND INTERSTATE ACTIVITIES IN ORDER TO ENHANCE NUCLEAR WASTE MANAGEMENT, COMPLIANCE, AND CLEANUP OF THE HANFORD SITE.
- ◆ *ENSURE* APPROPRIATE OVERSIGHT FOR THE SAFE MANAGEMENT AND DISPOSAL OF RADIOACTIVE WASTES AT THE RICHLAND COMMERCIAL LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE.

# **Sitewide Groundwater and Vadose Zone Project**

## ***MISSION***

*PROVIDE EXCELLENCE IN THE UNDERSTANDING OF GROUNDWATER, VADOSE ZONE AND THE COLUMBIA RIVER USING STATE OF THE ART SCIENCE AND TECHNOLOGIES AND EXPEDITE THE CLEANUP OF VADOSE ZONE AND GROUNDWATER THROUGH SITEWIDE INTEGRATION, INNOVATIVE TECHNOLOGY DEPLOYMENT.*

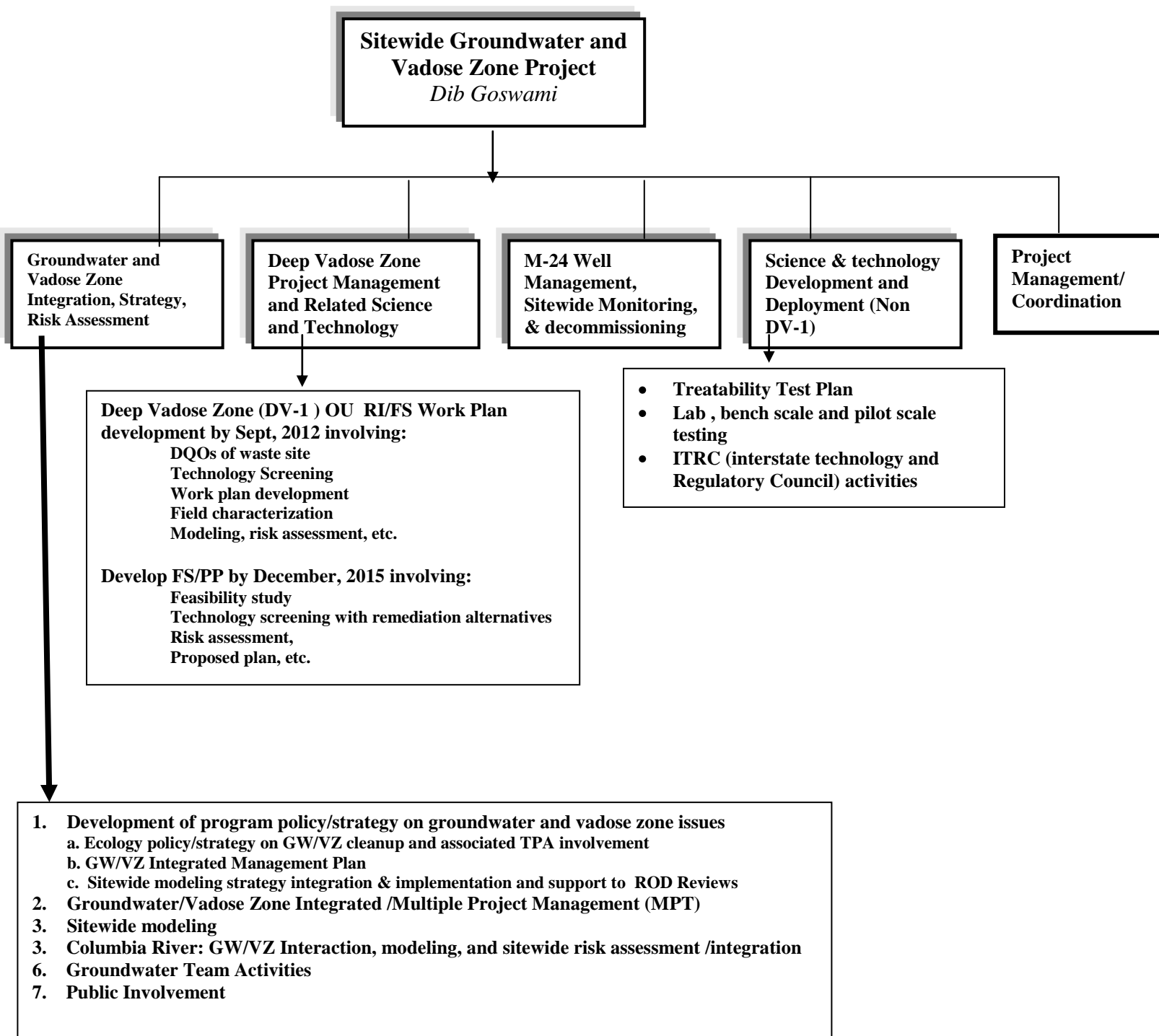
## ***OBJECTIVES***

- Develop and maintain a holistic cleanup approach for the groundwater and vadose zone of the Hanford site through the integration of related activities.
- Integrate site wide groundwater and vadose zone activities of the Hanford Site and assess and integrate various risk and cumulative impact assessment studies to be conducted at the Hanford site and on the Columbia River.
- Continue to address groundwater and vadose zone issues through the groundwater team.
- Provide timely and professional responses to issues raised by USDOE, Tribal Nations, State of Oregon, Natural Resource Trustee Council, Hanford Advisory Board and other interested parties.

## **Project Scope**

The sitewide groundwater and vadose zone project bring about consistency by providing professional recommendations for groundwater and vadose zone modeling, remediation, well installations, monitoring, risk and impact assessment, integration of related activities and engineering, and management and budgets issues. The project staff communicates with NWP core projects, and with stakeholders, Tribal Nations, the Hanford Advisory Board, and the public, in representing Ecology positions on various sitewide policies and issues related to groundwater and vadose zone of the Hanford Site.

## Project Structure



## **PROJECT STRUCTURE**

The site wide groundwater and vadose zone project is divided into 6 major units. :

### **1. Sitewide Groundwater and Vadose Zone (GW/VZ) Strategy, Policy, and Integration :**

- 1.1. Sitewide Groundwater and Vadose Zone Strategy and Policy Development and Implementation
- 1.2 Sitewide Groundwater and Vadose Zone Integration
- 1.4. Columbia River
- 1.5 Groundwater Team Management
- 1.6 Public Involvement

### **2. Deep Vadose Zone Project Management and Related Science and Technology**

- 2.1. 200-DV-1 OU RI/FS Work Plan and FS/PP development
- 2.2. Other (Non-DV-1) deep vadose zone activities

### **3. Science and Technology Development and Deployment**

- 2.1 Science and Technology on Groundwater and Vadose Zone Remediation
- 2.2 GW/VZ Modeling
- 2.3 Inter -state Technology and Regulatory Council (ITRC): Technology Transfer

### **4. M-24 Well Management, Sitewide monitoring and well decommissioning:**

- 4.1 M-24 Well Installation
- 4.2 Well decommissioning
- 4.3 Sitewide surveillance and Annual Groundwater Report assessment
- 4.4 Sitewide RCRA Quarterly Monitoring
- 4.3 Geophysical well logging

### **5. Project Management**

## **JOB DESCRIPTION**

### **1. Sitewide Groundwater and Vadose Zone (GW/VZ) Strategy, Policy and Integration**

The sitewide groundwater and vadose zone strategy, policy and integration include the following component:

#### **1.1 *Sitewide Groundwater and Vadose Zone Strategy and Policy Development and***

***Implementation:*** The task involves the development of necessary program policies and strategies in consultation with staff, project managers, section managers, and senior management on various clean up related issues dealing with both vadose zone and groundwater. Provides necessary support in developing program/agency position for Tri-Party negotiation, litigation, etc.. Serves as the Nuclear Waste Program's lead hydrogeologist with cross-section, cross program, interagency and interstate duties and responsibilities with issues of technical complexity, controversial, and political sensitivity. These activities are continuous and often involved with emerging issues. The task requires seeking input from Hanford Advisory Board, Tribal Nations, and the State of Oregon.

**One of the tasks would be to develop various performance measures of groundwater activities to quantify the progress on a quarterly basis to the management.**

#### **1.2 *Sitewide Groundwater and Vadose Zone Multiple Project Integration (MPT):*** Tri-Parties are moving forward an integrated approach to managing all of Hanford's groundwater and vadose zone activities. This approach implements commitments:

- Integrate groundwater, vadose zone, and source area cleanup decisions.
- Consolidate modeling and risk assessment work for the Hanford Site
- Consolidate groundwater and vadose zone activities under a single project i.e. DOE-RL Groundwater Remediation project.

Ecology will be involved in the baseline planning for all integration project work including core projects. Ecology's goal is to avoid duplication of effort and overlaps among various core projects in carrying out characterization activities and associated remediation approach. Efforts will be made to bring consistency and completeness in the development, documentation, and communication of various conceptual models such as inventory release, vadose zone, and groundwater in various impact assessment studies.

##### **1.2.1. *Site Specific Integrated Field Activities:*** The following site specific integrated filed activities are planned:

- a. B area integrated project: Covers the 200-BP-5 Groundwater Operable Unit (OU) and sources above it. The sources include both past practice waste disposal sites as well as the B-BX-BY and C Tank farms.

- b. T area integrated project: Covers the 200-ZP-1 Groundwater OU and sources above it. The sources include both past practice waste disposal sites as well as the T, TX-TY Tank farms.
- c. Deep vadose zone integrated project: It encompasses an integrated approach to deep (~>60 feet) vadose zone soil remediation in the central plateau covering both the tank farms and the past practice sites.
- d. 100 Area integrated project: It encompasses the activities along the 100 area river corridor groundwater and vadose zone issues. Although most of the soil sites are cleaned down to a depth of 15 feet and deeper, contamination still exists below this clean up depth as well as in groundwater. An integrated effort to clean up the groundwater at or below drinking water standards is required.

#### ***1.4. Sitewide Groundwater and Vadose Zone Modeling***

The objective of the sitewide groundwater and vadose zone modeling development exercise is to develop broadly applicable site-wide groundwater and vadose zone models for the Hanford Site. The purpose is to foster:

- Consistency in assumptions that are used across programs.
- Model enhancements based on new data/information and improved technical abilities.
- Model flexibility for new drivers and decisions.

#### ***1.5. Columbia River:*** The following components are addressed in this implementation plan

***1.5.1 Columbia River Risk and Impact Assessment:*** The Columbia River Component will use the CERCLA process to identify the contribution and associated risks of Hanford Site contaminants within a defined study area along the river. In conducting this assessment, the project will begin by taking a broad view of what constitutes the river corridor in terms of its length and width, and then allow the data to determine where the final boundaries should be drawn

Both components of the RCBRA consist of a multi-step process that will include the compilation of existing data, preparation of risk assessment work plans, identification of issues and data gaps through the data quality objective (DQO) process, identification of appropriate receptors and endpoints, development of sampling and analysis plans, data collection and analysis, and calculation of risks based on measurement endpoints specified in the DQO. Information pertinent to both components of the RCBRA will be collected during the initial DQO interview for the 100 Area and 300 Area Component. However, information relating to the Columbia River Component will not be fully analyzed until the 100 Area and 300 Area Component DQO process and SAP have been completed. There may also be a follow-up DQO conducted for the Columbia River Component, if required. Results of data collection, analysis, and risk evaluation will be published in a final risk assessment report for the Columbia River Component.

***1.5.2 Science and Technology in the Columbia River:*** A number of science and technology initiatives are currently in progress to study the impact of Hanford contamination on the river eco-systems. Ecology staff will be involved in the following main tasks:

- Data and models for groundwater and river interaction.

- Biological fate and transport data and models for critical contaminants such as strontium, chromium, etc..
- Aquatic impact assessment of strontium and uranium.
- Identify species for study of adaptive response, etc.

**1.6. Groundwater Team Management:** The task is to hold both groundwater and hydrogeology team meetings on a regular basis to address groundwater and vadose zone issues across the site. The groundwater team will involve meeting with a broader audience involving three tribal nations, the state of Oregon, and interested Hanford Advisory Board members.

### **1.7. Public Involvement**

The GW/VZ Integration Project operates in an open environment and encourages participation by interested parties including stakeholders, Tribal Nations, Hanford Advisory Board, Natural Resource Trustee Council, and the public. The project attempts to effectively communicate plans and activities. Credibility must be established with the above mentioned groups. Specific tasks are:

- Attend-monthly open integration / groundwater protection project meeting.
- Participate in preparing the semi-annual reports on the integration project for the members of the congress, Tribal Nations, and other stakeholders.
- Focus sessions with individual task group, Tribal Nations, Oregon Office of Energy, Oregon Waste Board, etc..
- Coordinate activities through the Groundwater Team of the NWP.
- Continue dialogue with HAB, Natural Resource Trustee Council, and other interested parties on issues related to groundwater and vadose issues, etc..

## **2.0. Deep Vadose Zone Project Management and Related Science and Technology:**

**2.1. 200-DV-1 OU Management:** The goal of the 200-DV-1 OU Project is to implement response actions that will protect human health, the environment, and groundwater that are associated with contamination from the 200-DV-1 OU waste sites. The 200-DV-1 OU waste sites are located on the Hanford Site Central Plateau.

The Deep Vadose Zone (200-DV-1) Operable Unit (OU) scope is defined in Appendix C of the Tri-Party Agreement. Currently, 47 waste sites are assigned to the 200-DV-1 OU. The waste sites were assigned to 200-DV-1 based on:

1. The unique remediation challenge of mobile contamination in the deep vadose zone,
2. The complex technical and regulatory challenge of deep vadose zone (DVZ) contamination (e.g., co-mingled plumes, determining nature and extent), and
3. The geographic proximity to Waste Management Areas (WMA).

The Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) Remedial Investigation and Feasibility Study (RI/FS) process will be utilized for investigation and study. The CERCLA Proposed Plan (PP)/Resources Conservation Recovery Act (RCRA)

Proposed Corrective Action Decision (PCAD) and RCRA Corrective Action Decision (CAD) plus CERCLA Record of Decision (ROD) process will be utilized for decision making. The 200-DV-1 OU decision process will:

- investigate the nature and extent of contamination from the surface to the groundwater,
- evaluate the potential impacts to human health and the environment;
- evaluate the potential impacts on groundwater and the Columbia River; and
- evaluate a combination of proven and emerging technologies for characterizing, remediating, and monitoring deep vadose zone contamination; and
- evaluate, select, and implement remedial solutions for contamination in the vadose zone to protect human health, the environment, and groundwater.

Some of the specific activities are:

200-DV-1 OU Waste Sites DQO

200-DV-1 Waste Sites Sampling Analysis Plan

Deep Vadose Zone Technology Screening

Data Collection Task as per the Work Plan

Carry out Treatability Tests

Carry out Vadose Zone Modeling

Carry out Risk Assessment

Carry out Feasibility Studies

Develop a defensible proposed plan

Carry out the necessary public Involvement

**2.2. Non-DV-1 Deep Vadose Zone Activities in the Central Plateau:** The main activities are:

- Carry out treatability studies in the non-DV-1 site (e.g. soil dessication of Tc-99 in the 200-BC Crib, uranium sequestration in the 200-UW, etc.)
- Integrate non-DV-1 technology development result into 200-DV-1 OU
- Carry out necessary site characterization activities at non-DV-1 sites (e.g. tank farms, etc.)

### **3.0 Science and Technology Development and Deployment and Implementation through ROD**

Hanford Site groundwater cannot be effectively cleaned up using existing technologies. The main purpose of this effort is to test and implement innovative technologies to address not only emerging groundwater and vadose zone issues but also develop and deploy innovative technologies in those areas where our current approach is not meeting remedial action objectives. Ecology would be working with EPA and USDOE for accelerated testing and final deployment of innovative cost effective technologies across the Hanford Site.

#### **3.1.1. Innovative Technology Deployment to Remediate Groundwater and Vadose Zone:**

The application of the conventional pump and treat and other base line technologies have shown that these technologies are not the permanent solution for Hanford groundwater at several sites. The strategy is to implement a robust science and technology program that will provide new

knowledge, data, and tools, and the understanding needed to solve groundwater and associated vadose zone problems. Some of the primary needs are:

- Address Cr contamination in groundwater and vadose zone along the river corridor (100-D, H, and K Area)
- Address Sr-90 contamination in N Area groundwater: Extension of Apatite Barrier; Phytotechnology and other technologies.
- Address U, Tc-99 in the central plateau: specialty for the deep Vadose zone

***Some of the ongoing technology demonstrations are apatite sequestration, electro-coagulation, phosphate reduction, biostimulation, phytoremediation, in-situ-redox manipulation, etc.***

Ecology is expected to direct and focus to meet and implement the above outlined strategy/technology needs for better, faster and cost effective cleanup of the Hanford soil and groundwater through upcoming Record of Decisions (RODs).

### ***3.1.2. ITRC (Interstate Technology and Regulatory Council): Technology Transfer***

Represent NWP as the lead technical representative to the ITRC. ITRC is a state-led coalition working together with industry and stakeholders to achieve regulatory acceptance of environmental technologies. ITRC consists of 48 states, the District of Columbia, multiple federal partners, industry participants, and other stakeholders, cooperating to break down barriers and reduce compliance costs, making it easier to use new technologies, and helping states maximize resources. ITRC brings together a diverse mix of environmental experts and stakeholders from both the public and private sectors to broaden and deepen technical knowledge and streamline the regulation of new environmental technologies. ITRC accomplishes its mission in two ways: it develops guidance documents and training courses to meet the needs of both regulators and environmental consultants, and it works with state representatives to ensure that ITRC products and services have maximum impact among state environmental agencies and technology users. The objective of our involvement is to help NWP staff build their knowledge base and raise their confidence about new environmental technologies through internet and class room trainings. Following internet trainings are planned in FY 09-11.:

- **Risk assessment methodologies on radioactively contaminated sites**
- **Bio-remediation of dense non-aqueous phase liquids (DNPLs)**
- **Monitored natural attenuation of metals and radionuclides**
- **Multi-incremental sampling**

## **4.0. Sitewide Well Installation and Decommissioning**

### ***4.1. Well Installation: M-24 Milestone***

The task is to integrate all programmatic sitewide groundwater monitoring needs for well installation across the Hanford Site and prioritization of these needs based on the Hanford clean up goals/milestones/missions and budgets. The “stimulus funding” is expected to increase in drilling activities. The immediate task would involve the following specific items:

- Develop a sitewide 3-year rolling well installation milestone under M-24 and complete the necessary public review process by September 2009
- Develop and complete the DQO for well installation requirements for CY 2009, 2010, and 2011.
- Carry out the necessary review and approval process for sampling and analysis plan (SAP), waste management plan to complete field work to meet M-24 milestone.

#### ***4.2. Well Decommissioning***

A LARGE NUMBER OF WELLS AT THE HANFORD SITE ARE NON-COMPLIANT WITH THE WAC173-160 REGULATIONS FOR GROUND WATER WELL MAINTENANCE AND DECOMMISSIONING, AND COULD SERVE AS POTENTIAL PATHWAYS FOR CONTAMINATION OF GROUNDWATER AND THE VADOSE ZONE. APPROXIMATELY 400 WELLS ARE EXPECTED TO BE DECOMMISSIONED USING THE STIMULUS FUNDING IN THE NEXT TWO YEARS. ECOLOGY IS ALSO DEVELOPING NECESSARY PATH FORWARD TO DECOMMISSION THESE WELL THROUGH THE PERMITTING PROCESS.

#### ***4.3. Site wide Groundwater Monitoring***

The task involves annual review of the site wide groundwater and vadose monitoring report submitted by USDOE. A thorough review and recommendation involves a detail investigation of new finding, scrutiny of the monitoring design, compliance evaluation, and the identification of data gaps. Ecology will play a proactive role in vadose zone monitoring. Ecology hydrogeologists have developed a broad technical guidance plan to be implemented through permitting and other regulatory process.

#### ***4.4 Sitewide RCRA Quarterly Monitoring:***

The task involves quarterly review of the monitoring report and make sure the reporting requirements are met in the annual groundwater monitoring report.

#### ***4.5. Geophysical Well Logging***

The FY 2011 geophysical logging plan was designed to include liquid waste disposal sites and specific retention facilities mostly located in the 200 area. A comprehensive sitewide plan is expected by September for out year planning. The data to be gathered during the FY 2011-13 monitoring effort are primarily to evaluate potential impacts to groundwater and include neutron moisture and spectral gamma-ray logs.

#### ***4.6 Field activities: Shore line and River Sampling:***

Field sampling will be conducted to investigate any unexpected events and monitoring of existing issues. The task involves a detailed DQO analysis and coordination with USDOE, Tribal Nations, EPA and Oregon DOE.

## **5. Project Management**

The Site-wide Groundwater and Vadose Zone Project is the only site wide project which has a number of specific tasks involving cross cutting issues. The project is extremely diverse and one of the most complex at the Hanford Site. The individual tasks/units are visible to public, stakeholder and other interested parties. The most notable project seems to be the deep vadose zone DV-1 and non-DV-1 sites) of the central plateau.

The GWVZ integration/protection program is involved with long term goals and missions of the Hanford cleanup and overall integration of soil and groundwater cleanup. Because of the complexity of the issues, and involvement of a numbers of entities, the progress is usually slow. However, the direct involvement of stakeholders and other interested parties helped the Tri-Parties to focus and address a number of complex issues which may otherwise produce erroneous results. Progress has been made in innovative technology deployment after a decade long break. The project management involves project planning, tracking and reporting activities, milestone negotiations, project strategy and policy development, public involvement and coordination with other agencies. The following figure shows a number of areas concerning the groundwater and vadose zone issues that will require public involvement.

**Milestone Table**

<b>Milestone/Agreement</b>	<b>Scope of Work</b>	<b>Date</b>
<b>M-015 -110A.</b>	<b>200-DV-1 RI/FS Work Plan</b>	<b>9/30/2012</b>
<b>M015-110B</b>	<b>200-DV-1 FS/PP</b>	<b>12/31/2015</b>
<b>M-24</b>	<b>Finalize the CY Well Prioritization and well Installation program for the Hanford Site</b>	<b>7/31 of each year</b>
<b>Groundwater Monitoring Report</b>	<b>Complete the Annual Groundwater Monitoring Report</b>	<b>7/31 of each year</b>

# **DATA DIRECTORY**

## **Data Dictionary**

<b>Job</b>	<b>Job code</b>
KCM19	Sitewide Groundwater and vadose Zone - CERCLA Cleanup related
KHM19	Sitewide Groundwater and Vadose Zone – RCRA related.

## **Project Overall Assumptions**

### **Overall Assumptions**

1. The planning cycle is for a total of 24 months. The planning date begins from July 1 of the upcoming state fiscal year, and goes through June 30 of the second year.

All full-time FTE is planned approximately 172 hours per month.

2. 15 hours per month is planned to support projects with unforeseen or unplanned project work. Projects are planned time for specialists and project managers to participate on foreseeable work.
3. Resources are available to fund all full-time FTEs in the program.
4. All work scope is to be fully planned in each of the projects. If there is more work to do than existing resources allow, a prioritization process will occur to determine which work will not be completed in the upcoming fiscal year.
5. Work scope will not be significantly changed by management, other project managers, specialists, or identified staff without being coordinated through all affected parties. Changes occurring after the initial plans have gone into effect will go through the formal change control process.
6. Ecology staff will be available to perform the assigned work scope.

**Table XX**

**Project Trends (7 Year/Workload Projections)**

<b>Upward Trends</b>	<b>Downward Trends</b>
<p>↑ Increase of chemist and hydrogeologists hours from the increase of field activities</p> <p>↑ Increase of HG hours on M-24 if agreement cannot be reached on the out year planning.</p> <p>↑ Increase in HG hours on the remediation strategy development if Public wanted more clarification, information, etc.</p> <p>↑ Increase in GW/VZ Compliance relates issues</p> <p>↑ Increase in workload if well decommissioning/abandonment is enforced.</p> <p>↑ Increase in HG hours if there is serous discrepancies in SAC, GW/VZ modeling/impact assessment</p> <p>↑ Unexpected incidental work on GW/VZ issues due to stakeholders, Tribal Nations, and other interested groups interests.</p> <p>↑ More compliance related issues</p>	<p>↓ No dispute/disagreement on M-24 regarding budget, scope of work, etc.</p> <p>↓ RCRA permit hours when EPA transfers the Corrective Action portion of the Hanford Site Wide Permit to Ecology.</p>

## **Long- term (7 Year) Life of Project Timeline**

The life of the GW/VZ/Water Specialist will continue as long as the NWP continues at the Hanford Site. There will always be groundwater and vadose zone monitoring at the site even after cleanup is complete to meet the requirements of regulations and assessment of the quality under any site use scenarios

### **Project Interfaces**

#### **Internal Interfaces**

- ◆ **Project Managers:** Interact with project managers to guarantee that both their permitting needs and the quality of work are being done to meet their needs.
- ◆ **Staff:** Encourage groundwater team staff to participate in the Groundwater Team. Provide an open environment where their views can be expressed and their needs met. Provide both technical support and regulatory review of their products to guarantee consistency throughout the program.
- ◆ **Groundwater/VZ Team:** Interact with team members and develop/work with a team approach on issues related to groundwater and vadose zone of the Hanford Site
- ◆ **Management:** Provide quarterly updates to the NWP management team to inform them of progress and/or any issues or problems that require their involvement.

#### **External Interfaces**

- ◆ **EPA and US Dept. of Energy and their Contractors and Expert panels.** Interact with the above groups jointly or on individual basis to discuss issues related to the GW/VZ integration, modeling, risk assessment, monitoring, waste management, and remediation. Attend scheduled brown bag and IAMIT meetings. A number of sitewide issues are co-leads with EPA and would require developing a common approach.
- ◆ **WDOH:** Interact with WDOH on sitewide field activities/sampling a monitoring and assessment of data and future planning of contract with WDOH.
- ◆ **Oregon Office of Energy (OOE):** Interact with OOE on issues related to integration and groundwater quality of the Hanford Site. Make presentation on the findings and develop a mutually agreeable policies on site investigation, Columbia River protection, regulatory framework, integration, etc. whenever possible.
- ◆ **Tribal nations and other Stakeholders:** Interact frequently with the Tribal nations on sitewide issues such as sampling, modeling, risk assessment, and other related issues of groundwater and vadose zone cleanup.

**Hanford Advisory Board (HAB):** Interact with the HAB and its sub-committees on issues related to integration, expert panel's recommendations, regulatory framework, and modeling. Communicate Ecology's position on cleanup as needed.

The external agencies and types of issues are listed below.

External Agency	Types of Issues
Department of Health	Groundwater sampling and associated DQO
EPA Field Office	TPA status, remediation (5 year ROD review), sampling, integration, modeling, risk assessment,
Hanford Advisory Board	Remediation, risk assessment, regulatory framework, integration, Columbia River, etc.
USDOE DOE and contractors, Expert Panels	GW/VZ integration, expert panel review, sampling, risk assessment, budget, waste management, stakeholders issues
Oregon Office of Energy and other interested parties	Cleanup policies, issues related to Columbia River protection, monitoring, uncertainties associated with characterization, data, etc..
Tribal Nations	GW/VZ integration, modeling, characterizations, risk assessment, Columbia River, etc.

### **Contracted Needs and/or Support**

**Sitewide Groundwater Monitoring Report Review by the Environmental Assistance Program (EAP), Ecology Head quarter:** EAP is given a contract to utilize about 180 hours of hydrogeologist 4 position to review the Hanford Site Annual groundwater Monitoring Report each year.

### Sitewide Groundwater and Vadose Zone Team roles and Contact List

<b>Name:</b>	<b>Job Duties (summary)</b>	<b>Phone:</b>	<b>Email Address:</b>
Dib Goswami	Overall Project/Task Leader/Coordinator. Carry out necessary policy/strategy development on GW/VZ, Deep Vadose Zone (DVZ) Project Management, Public involvement I, Columbia River and River corridor risk and impact assessments, field activity planning and execution, etc.	372-7902	dgos461@ecy.wa.gov
Brenda Jentzen	Regulatory support for DV-1 OU	372-7912	bjen461@ecy.wa.gov
Verlijan Robin	Regulatory issues on Technology Demonstration	372-7930	Vrob461@ecy.wa.gov
Jeff Ayres	GW/HG Team, Well decommissioning, RCRA Monitoring	372-7881	Jayr461@ecy.wa.gov
Joe Caggiano	RCRA GW monitoring, GW Team, Tank Area integrated Project.	372-7915	dsin461@ecy.wa.gov
Alisa Huckaby, Jacqui Seiple, Jackson, Joe Caggiano	Annual Gw Mon. Report, GW Team and HG Team Mtgs.,	372-7909	
Zelma Jackson	DV-1 Support, GW/HG team support	Zjac461@ecy.wa.gov	372-7910
Ginger Wireman	Public Involvement	372-7935	Gwir461@ecy.wa.gov
Alisa Huckaby	S & T: Phyto Technology, Apatite Sequestration		Ahuc461@ecy.wa.gov
J. Seiple	Science and Technology, 100 Area Integrated Project,		
Beth Rochette	Columbia River, DV-1 and GW team support	372-7922	Broc461@ecy.wa.gov
Jerry Yokel	DV-1 support, GW Team	372-7937	Jyok461@ecy.wa.gov
Nina Menard/ Alicia Boyd	Interaction w/ Specialist/PI, GW Team, etc.	736-3029	
Project managers (cleanup, tank-storage, tank-disposal, waste management)	Regulatory framework, M-24 and integration related activities		Jeff Lyon, ,Deborah Singleton, and involved hydrogeologists